# Advancing Methane Recovery and Use in the Oil and Gas Industry: Domestic and International Partnership Opportunities

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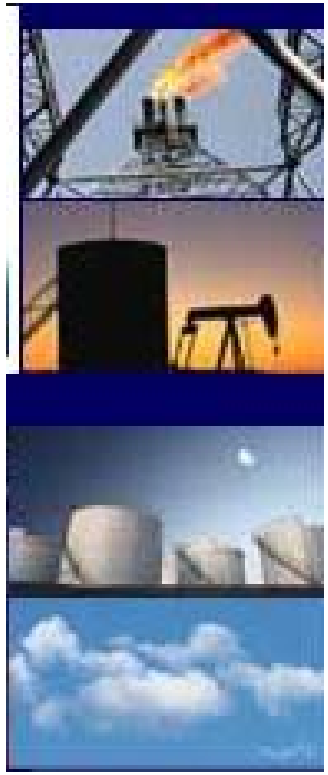
# Overview

- The Importance of Methane
- Natural Gas STAR
- Methane to Markets and International Gas STAR
- Asia/Pacific Partnership



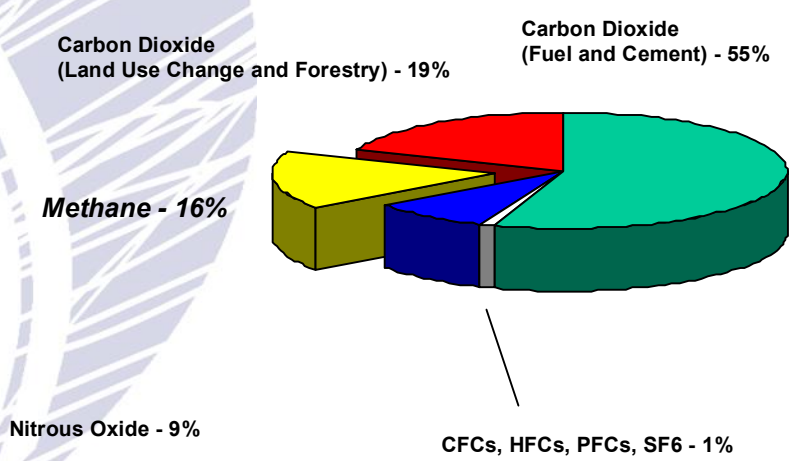
# Why focus on Methane?

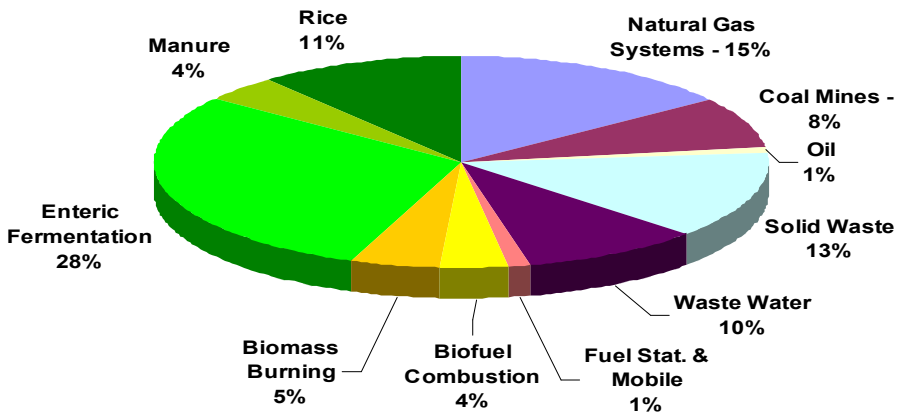
✓*A potent greenhouse gas (GHG) with 100-year global warming potential of 23; atmospheric lifetime of ~12 years*

✓*The 2nd most important GHG accounting for ~18% of total climate forcing*

✓*A primary constituent of natural gas and a valuable, clean-burning energy source*

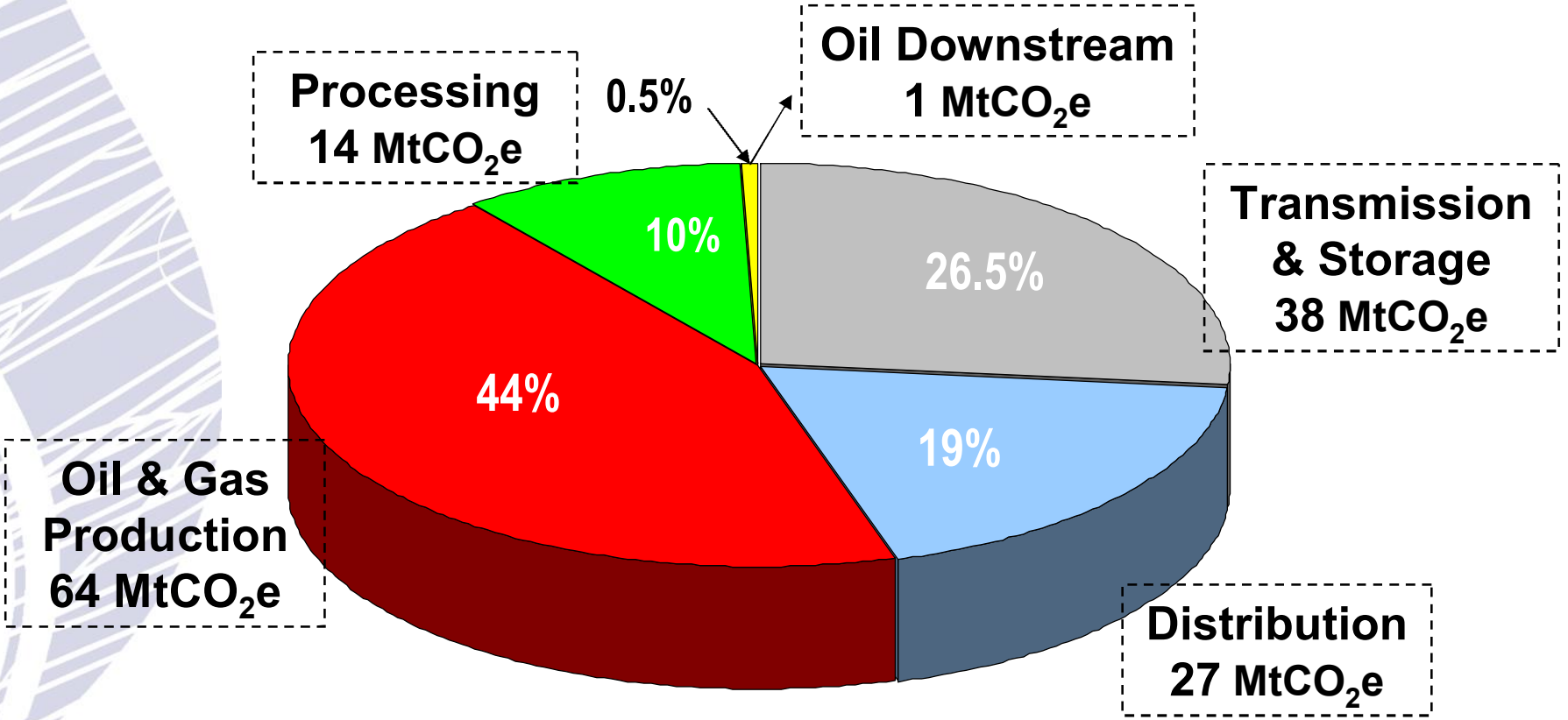
**Global GHG Emissions in 2000**
**40,702 million tonnes carbon dioxide equivalent ($MtCO_2e$)**



# Methane Emissions from the U.S. Oil and Gas Industry

- Methane losses from the U.S. oil & natural gas industry total 144.6 $MtCO_2e$
  - Accounts for 2% of total U.S. greenhouse gas emissions




*Inventory of U.S. Greenhouse Gas Emissions and Sinks 1990 – 2004,* U.S. EPA, April, 2006

# Methane Recovery Opportunities

- Methane-saving projects are profitable in a variety of ways:
  - Sales value of recovered methane and other hydrocarbons
  - Lower operating, fuel, and capital replacement costs
    - Installing state-of-the-art equipment
    - Reduced maintenance requirements
  - Potential carbon market value of captured methane

# Methane Recovery Projects

Leak inspection and repair

Change compressor maintenance and shutdown practices

Install vapor recovery on storage tanks

Reduced emission completions

# Public-Private Partnerships can Help Realize Project Opportunities

NaturalGas
EPA POLLUTION PREVENTER

Methane to Markets

Asia-Pacific Partnership

Voluntary, cost-effective approach

Exchange information

Address barriers

Technology transfer

Bring together interested parties and stakeholders

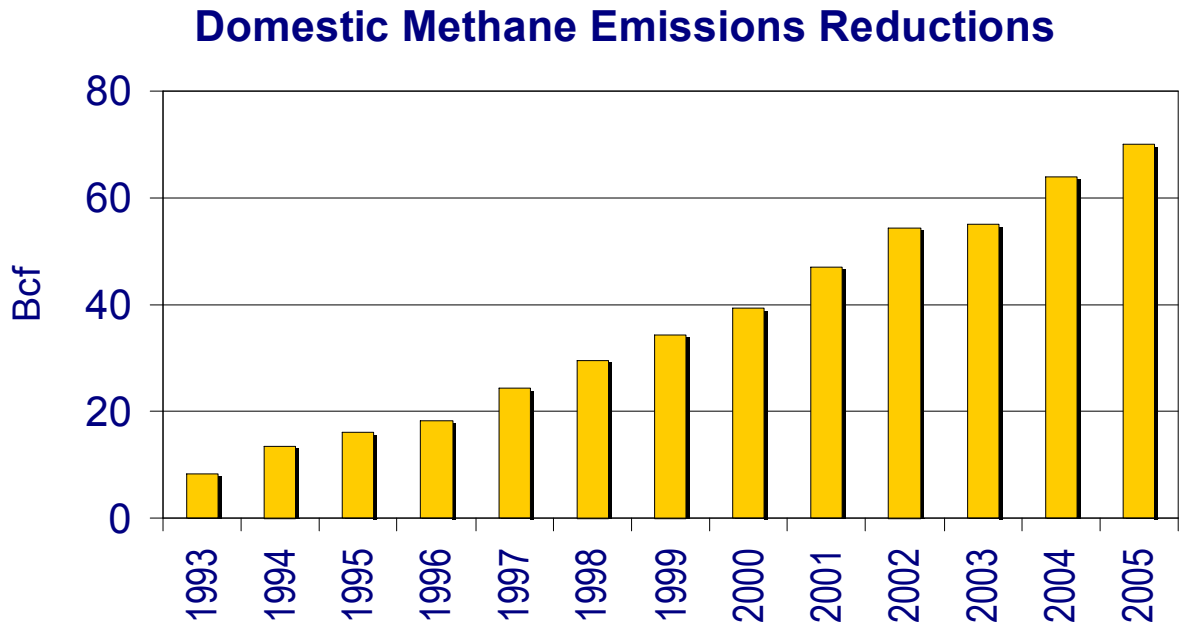
**Reduced emissions, increased efficiency, maximized profits**

# Natural Gas STAR Program

**The Natural Gas STAR Program is a *flexible, voluntary partnership* between EPA and the U.S. oil and natural gas industry designed to *cost-effectively* reduce methane emissions from natural gas operations.**

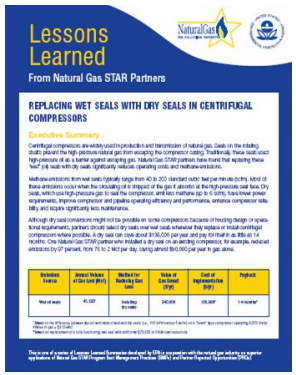
# Domestic Natural Gas STAR

- 116 partners
- 18 endorsing associations
- 460 billion cubic feet (Bcf) cumulative methane reductions



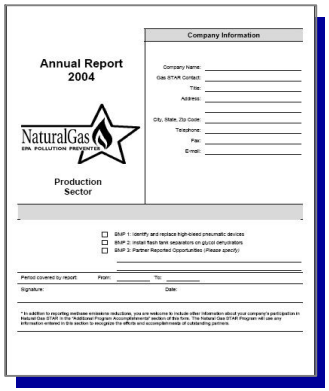
# Natural Gas STAR - Key Components

- Technology transfer
  - Provide technical information and training
  - One-on-one assistance to identify and implement cost-effective methane emission reduction projects
- Reporting
  - Maintain records of voluntary actions




Technology Transfer

Workshops

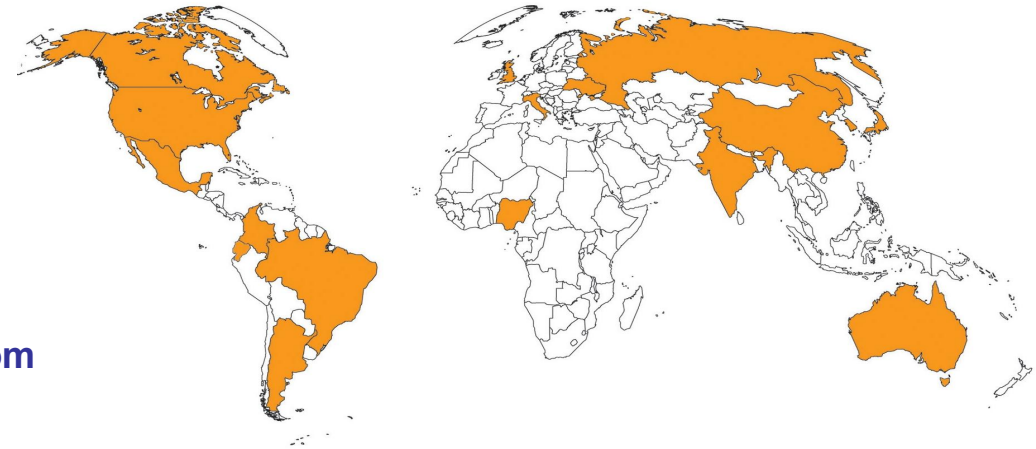



Annual Reports

# Methane to Markets Partnership

- Advances recovery and use of methane as a valuable clean energy source
- Encourages development of ***cost-effective*** methane recovery and use opportunities in
  - coal mines
  - landfills
  - oil and gas systems and
  - agriculture (manure waste management)
- Private companies, multilateral development banks and other relevant organizations participate by joining the ***Project Network*** – *over 350 organizations now participating*
- 18 partner countries

| | |
|---|---|
| **Argentina** | **Italy** |
| **Australia** | **Japan** |
| **Brazil** | **Korea** |
| **Canada** | **Mexico** |
| **Colombia** | **Nigeria** |
| **China** | **Russia** |
| **Ecuador** | **Ukraine** |
| **Germany** | **United Kingdom** |
| **India** | **United States** |



# Methane Emissions from the Oil and Gas Industry

- Methane to Markets (M2M) countries contribute 56% of global methane emissions from oil and gas systems

**2005 Methane Emissions from Natural Gas and Oil Systems ($MtCO_2e$)**

| | |
|---|---|
| Russia | 172.7 |
| U.S. | 144.6 |
| Ukraine | 90.8 |
| Mexico | 77.2 |
| Nigeria | 51.3 |
| Canada | 38.3 |
| India | 26.0 |
| Argentina | 15.1 |
| U.K. | 8.0 |

| | |
|---|---|
| Germany | 7.7 |
| Australia | 7.6 |
| China | 6.3 |
| Italy | 5.4 |
| Korea | 4.1 |
| Brazil | 3.7 |
| Colombia | 1.9 |
| Ecuador | 0.7 |
| Japan | 0.4 |

| | |
|---|---|
| **Total M2M Countries:** | **661.6** |
| **Total World:** | **1,182.0** |

*Global Anthropogenic Emissions of Non-$CO_2$ Greenhouse Gases 1990-2020*, U.S. EPA, June, 2006

# M2M Oil and Gas Subcommittee

- Chair: Mexico
- Co-Chair: Russia


- In subcommittee meetings, members have
  - Shared goals
  - Shared country profiles
  - Developed oil and gas action plan

- ✓ Tomsk, Russia
- ✓ Buenos Aires, Argentina
- ✓ Villahermosa, Mexico

# Recent and Upcoming Events and Projects

- **Oil and Gas Methane Emission Reduction Workshop.** Hosted by Occidental Petroleum, Colombian Ministries of Energy and Environment. Bogotá, Colombia. October 2005

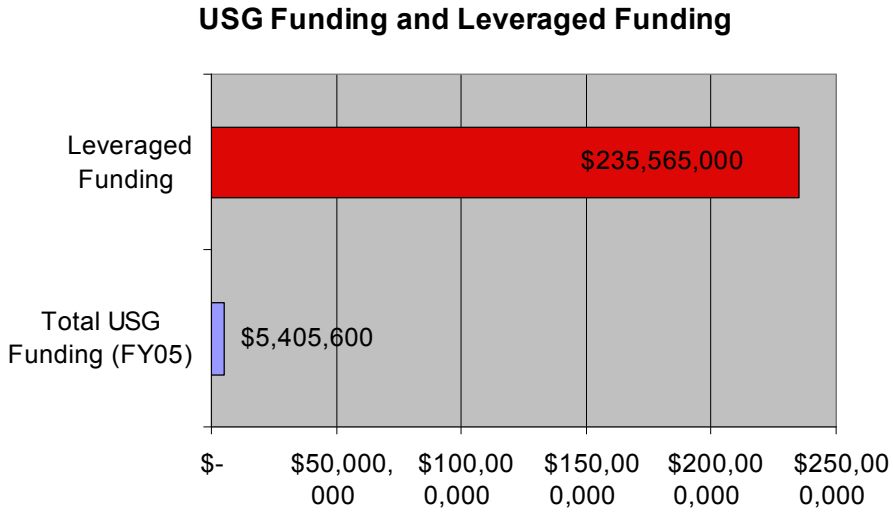
- **Technology Transfer Workshop & Plant Tour.** Hosted by PEMEX. Villahermosa, Mexico. April 2006

- **Canadian / U.S. Methane to Markets Gas Processing Efficiency and Methane Emissions Reduction Workshop** Hosted by CETAC-West, Environment Canada. Calgary, Alberta January 2007

- **Many Cost-Effective Methane Emission Reduction Projects Are Underway**

# U.S. Involvement in M2M

- U.S. is leveraging significant investment and engagement from the private and public sectors



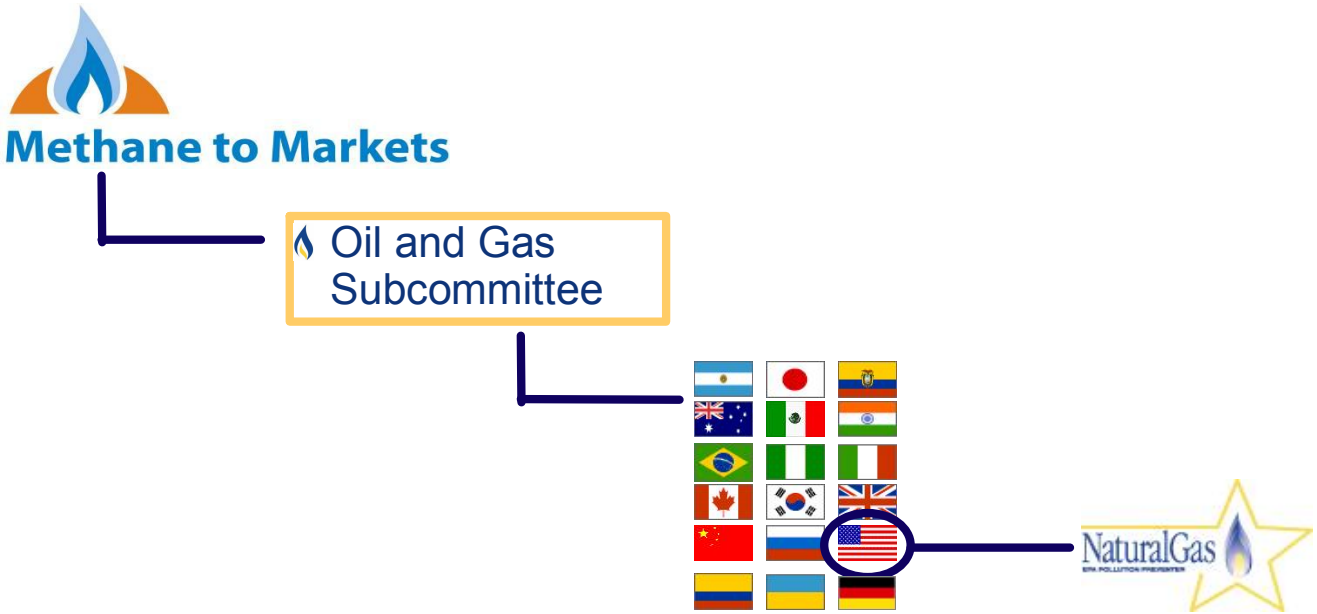

- U.S. is providing up to $53 million to support the Partnership
- U.S. EPA is coordinating efforts across the U.S. government (USG) and staffs the Partnership's Administrative Support Group

# U.S. Involvement in M2M

- Key activities to advance project development;
  - Identify and assess project opportunities
  - Support technology transfer, training, and capacity building
  - Address barriers to project development and increase access to information
  - Technology demonstration and deployment
- Ongoing projects and activities are expected to achieve annual emission reductions of 3 $MtCO_2e$

# Natural Gas STAR International

- Under the Methane to Markets Partnership, U.S. EPA is expanding Natural Gas STAR internationally
- EPA is encouraging existing partners to engage their international operations to voluntarily reduce methane emissions
- Companies world-wide are welcome to join Gas STAR International



# Natural Gas STAR International

- Charter Partners






- Participation involves:
  - Developing an implementation plan
  - Identifying and implementing cost-effective projects
  - Reporting your success

- Support from Gas STAR International is available to:
  - Identify top cost-effective methane reduction project opportunities
  - Conduct project pre-feasibility analysis
  - On-site training and workshop development

# Asia-Pacific Partnership on Clean Development and Climate

- A voluntary framework to accelerate the development and deployment of clean energy technologies internationally
- Focus on expanding investment and trade in cleaner technologies, goods, and services in key market sectors
- Eight public-private task forces: (1) cleaner use of fossil energy; (2) renewable energy and distributed generation; (3) power generation and transmission; (4) steel; (5) aluminum; (6) cement; (7) coal mining; and (8) buildings and appliances.

# Cleaner Fossil Task Force

- U.S. Members:  DOE, EPA, API, EPRI
- Focus on clean coal technology and carbon storage, liquefied natural gas (LNG)
- EPA Role
  - Coordinating with Methane to Markets Partnership
  - Exploring opportunities for methane recovery from oil and gas
  - Understanding methane emissions and cost-effective reduction opportunities from LNG facilities

# In Summary

- Advancing methane recovery and use opportunities can benefit the industry as well as the environment
- Public-private partnerships, like Natural Gas STAR, have proven that voluntary, cooperative efforts can deliver results
- Methane to Markets (Gas STAR International) and the Asia Pacific Partnership offer new opportunities for collaboration



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